

WHAT IS CLAIMED IS:

1. A method for attenuating an optical beam, said method comprising:

generating a communication beam at an optical input fiber;

generating an alignment beam at a beam generating element, wherein

said alignment beam is associated with said communication beam;

receiving said alignment beam on a sensor, wherein said sensor provides

a location of said alignment beam on said sensor; and

positioning said communication beam so that a desired percentage of said

communication beam enters an output fiber, wherein said positioning of said

communication beam comprises an offset from said location of said alignment beam.

2. The method according to claim 1, wherein said positioning is performed by a method comprising:

directing said communication beam to a micro electromechanical (MEMS)

device; and

positioning said MEMS device so that said desired percentage of said

communication beam enters said output fiber.

3. The method according to claim 1, wherein said positioning is performed

2 by a method comprising:

directing said communication beam to a first micro electromechanical  
4 (MEMS) device;

positioning said first MEMS device so that said communication beam is  
6 reflected from a surface of said first MEMS device and is redirected to a second  
MEMS device; and

8 positioning said second MEMS device so that said desired percentage of  
said communication beam enters said output fiber.

4. The method according to claim 1, said method further comprising:

2 repeatedly receiving said alignment beam to provide updated locations of  
said alignment beam; and

4 repositioning said communication beam as necessary to reflect any  
change in location of said alignment beam to maintain the desired percentage  
6 of said communication beam that enters said output fiber.

5. The method according to claim 1, said method further comprising:

2 repeatedly determining said desired percentage of said communication  
beam that enters said output fiber to determine if said desired percentage has  
4 changed; and

repositioning said communication beam as necessary to reflect any  
change in said desired percentage of said communication beam that enters said  
output fiber.

6. The method according to claim 1, said method further comprising:  
positioning said communication beam at about a center of a core in said  
output fiber so that about all of said communication beam enters said output  
fiber.

7. The method according to claim 1, said method further comprising:  
positioning said communication beam at an offset from a center of a core  
in said output fiber so only a portion of said communication beam enters said  
output fiber.

8. The method according to claim 7, wherein each of a plurality of locations  
on said sensor corresponds to a particular offset that said communication beam  
enters said output fiber.

9. The method according to claim 1, wherein said communication beam and  
said alignment beam are generated at a beam generation element, and wherein

4 said communication beam and said alignment beam proceed along paths that  
are substantially parallel.

2 10. The method according to claim 1, wherein said communication beam and  
said alignment beam are generated at a beam generation element, and wherein  
said communication beam and said alignment beam proceed along paths that  
4 are parallel.

2 11. The method according to claim 1, wherein said communication beam and  
said alignment beam are generated at a beam generation element, and wherein  
said communication beam and said alignment beam proceed along paths that  
4 are converging.

2 12. The method according to claim 11, wherein said alignment beam and  
said communication beam cross approximately midway along an optical path.

2 13. The method according to claim 1, wherein said communication beam and  
said alignment beam are generated at a beam generation element, and wherein  
said communication beam and said alignment beam proceed along paths that  
4 are coaxial.

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14. The method according to claim 1, wherein said sensor comprises a sensor selected from the group selected from a position sensitive diode (PSD), a charge coupled device (CCD), and a light sensitive CMOS sensor.

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15. The method according to claim 1, wherein said sensor comprises a position sensitive diode (PSD).

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16. The method according to claim 1, wherein said sensor comprises a charge coupled device (CCD).

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17. The method according to claim 1, wherein said sensor comprises a light sensitive CMOS sensor.

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18. The method according to claim 1, wherein said alignment beam is generated by a light source selected from the group consisting of a light emitting diode (LED), an optical fiber, a laser, and a vertical cavity surface emitting laser (VCSEL).

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19. The method according to claim 1, wherein said alignment beam

2 comprises a light emitting diode (LED), said method further comprising:  
providing a LED mask at said beam generating element to control an  
4 amount of light produced by said LED.

20. The method according to claim 1, said method further comprising:  
2 providing a first lenslet at said beam generating element, wherein said  
lenslet collimates said alignment beam.

21. The method according to claim 20, said method further comprising:  
2 providing a second lenslet at a beam receiving element, wherein said  
second lenslet focuses said alignment beam onto said sensor.

22. The method according to claim 1, said method further comprising:  
2 providing a lenslet at said beam generating element, wherein said lenslet  
collimates said communication beam.

23. The method according to claim 22, said method further comprising:  
2 providing a second lenslet at a beam receiving element, wherein said  
second lenslet focuses said communication beam.

24. The method according to claim 1, wherein said alignment beam is generated by a light supplying fiber that is positioned in a fixed spatial relationship with said optical input fiber.

25. A method for attenuating a plurality of optical beams, said method comprising:

generating a plurality of communication beams at an optical input fiber;

generating a plurality of alignment beams at a beam generating element, wherein each of said plurality of alignment beams is associated with one of said plurality of communication beams;

receiving each of said plurality of alignment beams at a respective sensor, wherein each of said plurality of sensors provides a location of a received alignment beam on said respective sensor;

positioning each of said plurality of communication beams so that a desired percentage of each of said plurality of communication beams enters an associated output fiber; and

wherein said positioning of each of said plurality of communication beams comprises an offset from an associated one of said plurality of locations of said alignment beams.

26. The method according to claim 25, wherein said positioning of each of  
said plurality of communication beams is performed by a method comprising:  
directing each of said plurality of communication beams to a micro  
electromechanical (MEMS) device; and  
positioning said MEMS device so that said desired percentage of each of  
said plurality of communication beams enters said associated output fiber.

27. The method according to claim 25, said method further comprising:  
repeatedly receiving each of said plurality of alignment beams to provide  
updated locations of each of said plurality of alignment beams; and  
repositioning each of said plurality of communication beams as necessary  
to reflect any change in location of each of said plurality of alignment beams to  
maintain the desired percentage of each of said plurality of communication  
beams that enter said associated output fiber.

28. The method according to claim 25, said method further comprising:  
repeatedly determining said desired percentage of each of said plurality  
of communication beams that enter said associated output fiber to determine  
if said desired percentage has changed; and  
repositioning each of said plurality of communication beams as necessary



6 to reflect any change in said desired percentage.

29. The method according to claim 25, said method further comprising:

2 positioning at least one of said plurality of communication beams at about  
a center of a core in said output fiber so that about all of said at least one of  
4 said plurality of communication beams enter said output fiber.

30. The method according to claim 25, said method further comprising:

2 positioning at least one of said plurality of communication beams at an  
offset from a center of a core in said output fiber so that only a portion of said  
4 at least one of said plurality of communication beams enters said output fiber.

31. The method according to claim 25, wherein each of said plurality of  
2 communication beams and each of said plurality of alignment beams are  
generated at a beam generation element; and

4 wherein each of said plurality of communication beams and each of said  
plurality of alignment beams proceed along paths that are substantially parallel.

32. The method according to claim 25, wherein each of said plurality of  
2 communication beams and each of said plurality of alignment beams are

generated at a beam generation element; and

wherein each of said plurality of communication beams and each of said plurality of alignment beams proceed along paths that are parallel.

33. The method according to claim 25, wherein each of said plurality of communication beams and each of said plurality of alignment beams are generated at a beam generation element; and

wherein each of said plurality of communication beams and each of said plurality of alignment beams proceed along paths that converge.

34. A method for providing optical beam attenuation using a single reflecting device, said method comprising:

providing a beam generating element comprising an optical input fiber and a first lenslet;

providing a beam receiving element comprising an optical output fiber and a second lenslet;

generating a communication beam at said optical input fiber;

collimating said communication beam at said first lenslet;

directing said collimated communication beam to a micro electromechanical (MEMS) device;

positioning said MEMS device so that said collimated communication beam is reflected and passes through said second lenslet to produce a focused communication beam;

wherein said MEMS device is positioned so that a desired percentage of said focused communication beam enters said output fiber; and

wherein said positioning of said MEMS device is based on known relative locations of said input fiber and said output fiber.

35. The method according to claim 34, said method further comprising:

repositioning said micro electromechanical (MEMS) device as necessary to maintain the desired percentage of said communication beam that enters said output fiber.

36. A method for providing optical beam attenuation using multiple reflecting devices, said method comprising:

providing a beam generating element comprising an optical input fiber and a first lenslet;

providing a beam receiving element comprising an optical output fiber and a second lenslet;

generating a communication beam at said optical input fiber;

8 collimating said communication beam at said first lenslet;

10 directing said collimated communication beam to a first micro  
electromechanical (MEMS) device, where said collimated communication beam  
is redirected to a second MEMS device;

12 positioning said second MEMS device so that said collimated  
communication beam is reflected and passes through said second lenslet to  
14 produce a focused communication beam;

16 wherein said second MEMS device is positioned so that a percentage of  
said focused communication beam enters said output fiber; and

18 wherein said positioning of said second MEMS device is based on known  
relative locations of said input fiber and said output fiber.

37. The method according to claim 36, said method further comprising:

2 repositioning said second micro electromechanical (MEMS) device as  
necessary to maintain the desired percentage of said communication beam that  
4 enters said output fiber.